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Misunderstanding Metaphor: What's the Problem?

ELLEN WINNER

Boston College and Harvard University

AND

MATTHEW ENGEL AND HOWARD GARDNER

Harvard University and Boston Veterans Administration Hospital

In order to investigate the potential difficulties posed by task demands and by surface features of metaphorical sentences, children aged 6, 7, and 9 years were presented with metaphorical grounds encoded in five alternative linguistic forms: predicative metaphors, topicless metaphors, similes, analogies, and riddles. The task demands posed by comprehension of predicative metaphors proved greater than those posed by topicless metaphors, suggesting that it is more difficult to specify the similarity between two given terms than it is to generate a missing term. When topicless metaphors were rewritten either in an explicit analogic form or in the form of a riddle, comprehension was increased; however, when predicative metaphors were rewritten as similies, the addition of the term "like" to make clear the similarity relationship between the two terms failed to elevate understanding.

The ability to process metaphorical language is a central aspect of linguistic competence, necessary in order to carry on an ordinary conversation ("Don't you think he's *brittle*?"); to make sense of the evening news ("Yesterday the agreement was *cemented*"); and to appreciate literature ranging from a fairy tale ("A king with a heart made of *ice* . . .") to *Macbeth* ("Oh, full of *scorpions* is my mind. . . .").

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Requests for reprints should be sent to Ellen Winner, Department of Psychology, Boston College, Chestnut Hill, MA 02167.

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Underlying every metaphor is a characterization of an object, property, or event that is achieved by indirect means. Consider the metaphorical statement, "The skywriting was a scar marking the sky." The indirection of this metaphor involves an assertion of equivalence that is not to be taken literally, but is to be transformed into an assertion of similarity. The two terms of the metaphor, the topic (skywriting) and the vehicle (scar) are neither identical (as in "Skywriting is the trace left in the sky by a jet's exhaust"), nor hierarchically organized (as in "Skywriting is a gaseous vapor"). Rather, the topic and vehicle of a metaphor belong to two separate, nonhierarchically related categories (in the above case, the two categories represented are gaseous vapors and marks on skin).

The motivation for a metaphor's assertion of equivalence is the illumination of a nonobvious similarity between two elements. The resemblance that justifies the nonliteral assertion of equivalence is customarily called the *ground* of the metaphor. The assertion of equivalence may be explicit, as in the previous example, in which the topic is equated to the vehicle (predicative metaphor); or the assertion may be a tacit one in which the vehicle is stated but the topic is only implied, as in "A scar marked the sky" (topicless metaphor).

Adults readily process and make sense of the kinds of metaphors encountered in daily usage (Glucksberg, Hartman, & Stack, Note 2) and there is reason to predict that children, too, would find such language easy to process: metaphorical usage is frequent, metaphorical perception has been considered a primary way of knowing the world (Arnheim, 1974; Verbrugge & McCarrell, 1977), and rudimentary metaphorical capacities have been demonstrated in preschool children (Gardner, 1974; Gentner, 1977; Winner, 1979) and in infants (Wagner, Winner, Gardner, & Cicchetii, Note 3).

Contrary to expectation, however, children exhibit considerable difficulty in comprehending linguistic metaphors (Billow, 1975; Winner, Rosenstiel, & Gardner, 1976; Coffman & Cirillo, Note 1). The explanations that have been offered to account for this comprehension difficulty fall into two classes. On the one hand, it has been argued that misunderstanding a metaphor reflects an inability to perceive the ground (cf. for example, Winner et al. 1976). That is, miscomprehension reflects an inability to discover or appreciate the link between the vehicle and the topic, whether the topic is explicitly stated or simply implied. By this account, failure to understand "The skywriting was a scar marking the sky" occurs because the child fails to appreciate a resemblance between skywriting and scar.

Alternatively, it has been argued that misunderstanding reflects relatively superficial aspects of the metaphor—either the task demands posed, or the surface aspects of its linguistic form (cf. for example, Ortony, Reynolds, & Arter, 1978). Unaware of what is being demanded, or misled by the form of the metaphor, the child fails to provide evidence of understanding. On this account, misunderstanding a metaphor may occur even when the child possesses the capacity to perceive the resemblance grounding the metaphor.

In this study, these competing hypotheses were tested by presenting children with metaphorical grounds encoded in five different linguistic forms: predicative metaphors, topicless metaphors, similes, analogies, and riddles. If the transformation of a metaphor into an alternative linguistic form (while preserving the ground) facilitates comprehension, it can be concluded that misunderstanding metaphor reflects problems with task demands or surface features rather than with the apprehension of the underlying ground.

This study allowed four comparisons: one between forms differing in surface aspects and also in task demands—i.e., the kind of answer required (predicative vs topicless metaphors); and three between forms differing in surface aspects but whose task demands are identical (predicative metaphors vs similes; topicless metaphors vs analogies; topicless metaphors vs riddles).

Predicative vs topicless metaphors. Understanding predicative and topicless metaphors requires, in both cases, that the ground be discovered. However, as a result of their different linguistic forms, these two types of metaphor pose different evident task demands—that is, they require different kinds of answers. In the case of a predicative metaphor, evidence that the listener has understood consists of explicitly verbalizing the ground linking the given topic and vehicle. Evidence of understanding in the case of a topicless metaphor consists of generating one term—the missing topic. While an appropriate topic can only be discovered if the listener is aware of the ground, this ground does not need to be explicitly formulated. It was predicted that, because they do not require an explicit statement of the ground, topicless metaphors should yield higher performances than predicative ones.

Predicative metaphors vs similes. Predicative metaphors (The skywriting was a scar marking the sky) can be rewritten as similes simply by adding the term "like" (The skywriting was like a scar marking the sky). In both cases, the correct solution consists of stating the ground. However, discovery of the ground of a predicative metaphor requires that the listener recognize that the assertion "$A = B$" is intended not literally but as an assertion of similarity ("$A =$ like B"). It was predicted that similes would yield higher performances because the similarity relationship is rendered explicit through the inclusion of "like".

Topicless metaphors vs analogies. Any topicless metaphor can be rewritten as a 4-term analogy in which comprehension entails generating one of the four terms (e.g., "A scar marks the skin and ___ marks the sky). While the correct solution of both an analogy and a corresponding topicless metaphor consists of generating the same term (skywriting), it was predicted that analogies would prove easier than topicless metaphors because the analogy form renders explicit the analogic comparison.

Topicless metaphors vs riddles. Topicless metaphors can also be rewritten as riddles whose solution entails the generation of one term (e.g., What is like a scar but marks the sky?). Solution of such a riddle demands that the listener generate the same term as demanded by solution of the corresponding metaphor. However, because their format is more familiar to children (and perhaps more "engaging"), riddles were predicted to be the easier of the two forms.

In summary, the present study was an attempt to determine whether misunderstanding of metaphor ought to be attributed to (1) an inability to discover the ground, or (2) the task demands of a particular form of metaphorical sentence (predicative vs topicless metaphors) or to surface aspects of metaphorical sentences (predicative metaphors vs similes; topicless metaphors vs analogies and riddles). If children are able to solve topicless before predicative metaphors, it can be concluded that the evident task posed by predicative metaphors is an obstacle; if children are able to solve analogies, riddles, or similes before the corresponding metaphors, it can be concluded that surface aspects of the metaphors alone (rather than the kind of answer required) pose an obstacle.

METHOD

Subjects

One hundred and twenty children, equally divided between boys and girls at each of three age levels (6, 7, and 9) participated in the study. Subjects, drawn primarily from middle-class backgrounds, were selected at random from their classrooms.

Materials

Fifteen predicative metaphors were constructed. For each sentence in this form, four corresponding items were constructed: a topicless metaphor, a simile, a riddle, and a quasi-anology.[1] Five forms of the test, each containing 15 items, were constructed: each item appeared in one of the five linguistic forms on each test. Thus, all subjects received three items of each form, but no subject received the same item expressed in more than one form. All of the items were based on a physical resemblance between two objects. A list of items is presented in Table 1.

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[1] "Quasi-analogies" rather than those in the form of *a*:*b*::*c*:*d* were used in the present study because they have proven less difficult for children to carry out (Levinson & Carpenter, 1974). In a quasi-analogy, the relation between *a* and *b*, and *c* and *d* is made explicit. For example, instead of "scar:skin::[*skywriting*] sky," a quasi-analogy states "A scar marks the skin and [*skywriting*] marks the sky," instead of "picture frame:picture::[*fence*]:field," "A picture frame surrounds a picture and [a fence] surrounds a field."

TABLE 1

LIST OF STIMULI IN PREDICATIVE METAPHOR FORM, PRESENTED IN ORDER OF DIFFICULTY, SUMMED ACROSS AGE AND FORM[a]

		% correct
1.	The skywriting was a scar marking the sky.	28
2.	The fence was a picture frame surrounding the field.	33
3.	The old man's hair was snow lying on his head.	40
4.	The snow was a bandage covering the town in winter.	50
5.	Her eyelids were curtains covering her eyes.	50
6.	The earrings were icicles hanging from her ears.	58
7.	The nuts were pebbles sticking on the brownies.	63
8.	The clouds were mushroom tops lying in the sky.	63
9.	The bark was a coat fitting the tree tightly.	65
10.	The stars were freckles dotting the sky.	72
11.	The roar was thunder echoing from the cage.	75
12.	His vein was a river flowing through his arm.	77
13.	The frosting was a layer of skin covering the cake.	77
14.	The headlights were eyes shining from the car.	77
15.	The raindrops were tears falling from the sky.	82

[a] Order of difficulty of items on the explication condition is presented since the range among items was much narrower in the multiple choice condition (from 65 to 88%). The relative order of difficulty was similar across age.

Half of the subjects were asked to explicate the items; half received a multiple choice version in which four choices were possible for each item. The four choices were *appropriate, inappropriate, associate of the topic,* and *associate of the vehicle.* Examples of these choices for the different forms are presented in Table 2. The erroneous choices were constructed on the basis of pilot data revealing the kinds of errors typically made on such tasks.[2]

Procedure

Each child was seen individually by one experimenter for about 20 min. Subjects in the explication group were told: "I'm going to read you some sentences. I want you to listen carefully and then I'm going to ask you some questions about each one." After hearing either form of metaphor, or a simile, subjects were asked, "What do you think that means?" After hearing a quasi-analogy ("A scar marks someone's skin and something marks the sky"), subjects were asked, "What is that something?" No question followed the riddle since the riddle itself was posed as a question. When subjects' responses were too incomplete to be scored, a non-directive probe was used: "Can you tell me anything more?"

Subjects in the multiple choice group were given the same instructions

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[2] In view of the fact that the error profiles were not revelatory, this manipulation has not been discussed in the results section.

TABLE 2
EXAMPLES OF THE FOUR CHOICES GIVEN ON THE MULTIPLE CHOICE CONDITION

	Appropriate	Inappropriate	Associate of topic	Associate of vehicle
Predicative metaphors and similes	They both make a line.	They both sit on a chair.	They both float in the air.	They both hurt you.
Topicless metaphors, riddles, and quasi-analogies	skywriting	a chair	air	a bandaid

and asked the same questions following each item type, but were asked to choose the best answer from four possible choices. Subjects were not allowed to respond by saying "that one," or "the second one," but were required to repeat or paraphrase their choices.

Scoring

Responses on the explication task were categorized in the same way as the choices on the multiple choice task. To account exhaustively for all explications, however, it proved necessary to include four additional error categories. For a response to a predicative metaphor or a simile to be judged appropriate, the child had to indicate that the topic and vehicle were not equivalent but only similar, and the relevant link between the two terms had to be stated. Thus, for the scar–skywriting example, a child who said, "Skywriting looks like a scar because both are sort of white lines" or "both mess up a smooth surface" or "both are long and thin" received an appropriate score. When responding erroneously to the predicative metaphors and similes, subjects were likely to elaborate only upon the topic ("Skywriting marks up the sky"); rarely did they state an entirely irrelevant ground or take the assertion as one of literal equivalence. For a response to any of the remaining three forms to be judged appropriate, the missing term supplied had to either be the one postulated by the experimenters in designing the item, or one judged close enough to be appropriate. Thus, for the above example, a response considered appropriate, besides skywriting, was "a streak of lightning," because lightning both defaces and is long and thin; a response considered inappropriate was "a cloud," because, although it marks the sky, it neither defaces the sky nor possesses a scar's typical linear shape.

One judge scored all of the responses on the explication task. Reliability with a second judge was computed on 270 of the responses. In judging whether a response was appropriate vs any one of the categories of inappropriate, 92% agreement was obtained; in further subdividing the inappropriate responses, 84% agreement was obtained.

RESULTS

Explication Condition

A 5 × 3 × 2 (Form × Age × Sex) analysis of variance of the total number of correct responses on the explication condition revealed significant effects of form $F(4, 220) = 9.25, p < .001$ and age, $F(2, 55) = 5.87$, $p < .005$. Turning first to the effect of form, the same relative difficulty was found at all ages, as revealed by Newman-Keuls post hoc tests at $p < .05$. Topicless metaphors proved easier than predicative ones; no difference was found between predicative metaphors and similes, or between topicless metaphors and analogies; riddles proved easier than topicless metaphors. Thus, two of the four predictions were supported. Table 3 presents the mean scores for each form and Table 4 presents the order of difficulty within each of the four comparisons. Turning to the effect of age, 7- and 9-year-olds performed equally well and at a higher level than did 6-year-olds (Newman-Keuls, $p < .05$).

Multiple Choice

A parallel analysis of variance performed on the total number of appropriate responses selected on the multiple choice condition yielded a significant effect of form, $F(4, 216) = 8.84, p < .001$ and age, $F(2, 54) = 8.8.$, $p < .001$. Newman-Keuls tests revealed, at the $< .05$ level, the same pattern of results as in the explication condition with one exception: analogies proved easier than topicless metaphors. Thus, in the multiple choice condition, three of the four predictions were supported. (See Table 4.)

TABLE 3

MEAN SCORES IN EXPLICATION AND MULTIPLE CHOICE CONDITIONS[a]

	Item type				
	Predicative metaphor	Simile	Topicless metaphor	Analogy	Riddle
		Explication			
Grade					
1	1.2	1.0	1.8	1.6	2.2
2	1.8	1.7	1.8	1.8	2.9
4	1.8	1.7	2.0	2.3	2.5
		Multiple choice			
Grade					
1	1.7	1.9	1.9	2.5	2.3
2	2.1	2.1	2.4	2.7	2.7
4	2.4	2.5	2.8	2.9	2.8

[a] Highest possible score for any item type = 3.0.

TABLE 4
PREDICTED VS FOUND LEVELS OF DIFFICULTY OF ITEM TYPES

Predicted	Explication	Multiple choice
Topicless > analogies[a]	Topicless = analogies	Topicless > analogies[b]
Topicless > riddles	Topicless > riddles[b]	Topicless > riddles[b]
Predicative > similes	Predicative = similes	Predicative = similes
Predicative > topicless	Predicative > topicless[b]	Predicative > topicless[b]

[a] That is, topicless metaphors were more difficult than analogies.
[b] Predicted order confirmed.

Other Findings

An additional 4-way analysis of variance was performed in which condition was included as a factor. This analysis confirmed the expectation that multiple choice would prove easier than explication. Condition did not interact with any of the other factors. In none of the analyses was there a significant effect of sex.

In order to determine whether certain types of resemblance were more difficult than others to apprehend, correct scores for each item were collapsed across form for each condition. Because the relative order of difficulty was similar across ages, scores were then collapsed across age. While the multiple choice condition yielded a rather restricted range of scores (from 65 to 88% correct), scores across items diverged widely on the explication condition (from 28 to 82% correct; see Table 1). The most difficult relationships for children to apprehend were, in order of difficulty, those linking skywriting and scar, fence and picture frame, hair and snow, snow and bandage, and eyelids and curtains. It is possible that, in these five items, the link spanned a greater distance between topic and vehicle than in such relatively easy items as those uniting raindrops and tears, or headlights and eyes. Further research is needed to determine whether the degree of semantic distance between topic and vehicle [as computed by judges' ratings, scaling or factor analysis (cf. Sternberg, Tourangeau, & Nigro, 1979)] affects the ease with which metaphors are solved.

DISCUSSION

While not all of the predictions were confirmed, the results of this study suggest that the task demands posed by predicative metaphors, and aspects of the surface forms in which topicless metaphors are encoded, pose obstacles to comprehension for children. The child who has the cognitive capacity to discover the ground that links the two elements of a metaphor may nonetheless fail to correctly solve that metaphor because of the nature of the answer required or because of aspects of the linguistic form. Thus, misunderstanding a metaphor need not reflect an inability to perceive metaphorical resemblances.

On both versions of the task, as predicted, presentation of the metaphor in topicless form increased performance. But just why should explaining the ground constitute the more difficult task? There are at least three possible reasons. First, both performances (solving topicless and predicative metaphors) require tacit understanding of the ground, but solution of the predicative metaphor also requires an explicit formulation of the ground. Second, explaining the ground requires a more analytic kind of knowledge than generating a topic. Topicless and predicative metaphors based on physical resemblance may both be understood by imagistic processes. To solve a topicless metaphor, the listener simply needs to name the object that is imaged. But to solve a predicative metaphor, one must analyze how two imaged objects are alike. And third, the tasks may well differ in the sheer amount of mental computation required. For the predicative form, something must be generated (the ground) and then explained; for the topicless form, explanation is not required.

The prediction that similes should prove easier than metaphors was not supported in either condition. Thus, it appears that rendering the similarity relationship explicit does not materially affect comprehension. This finding suggests that the difficulty in understanding a metaphor does not reside in the fact that a similarity relationship is expressed indirectly. Children appear to recognize that a metaphor in the form of $A = B$ is intended to mean $A =$ like B. Rather, the difficulty in understanding lies in determining just *how* B could be like A, and this is a challenge posed equally by metaphors and similes. It should be noted, however, that this conclusion may not be valid for metaphors based on other than physical grounds. Previous research has shown that 6- and 7-year-olds sometimes interpret psychological–physical and cross-sensory metaphors literally (Winner et al., 1976). The discrepancy in these two sets of findings may, however, be explained by the fact that physically grounded metaphors are easier to interpret. Had this test been given to preschool aged children, it is quite likely that these children would have interpreted the metaphors literally but succeeded on the similes.

Whether these findings can be generalized to metaphors for which both a literal and a figurative interpretation are permissible is also not known. The items used in this study, if interpreted literally, yielded implausible statements. This implausibility may serve as a cue to transform the relation of equivalence to one of similarity. However, such a "within sentence" cue is not present in all metaphors. Consider the following metaphor: "Robert is a magician," said of someone who is not literally a magician but who has just solved a seemingly hopeless conflict. Out of context, both a literal and a metaphorical interpretation are equally plausible. It is quite possible that metaphors for which literal interpretations are plausible are not solved as easily as their corresponding similes, precisely because they may be taken literally.

The predicted order of difficulty between topicless metaphors and analogies was upheld in the multiple choice but not in the explication condition. This discrepancy may be due to the fact that a multiple choice measure taps a more tacit level of understanding and thus qualifies as a more sensitive measure. If so, the prediction was upheld that the reorganization of a metaphor into an explicit analogical comparison facilitates comprehension.

Finally, on both versions of the task, as predicted, riddles proved easier than topicless metaphors. Both of these forms supply a vehicle (e.g., scar), a ground (marks something) and specify the domain from which a topic must be found (sky). Yet riddles are more familiar fare to young children than metaphors, suggesting that one of the obstacles confronting the child in the task of metaphor comprehension is sheer lack of familiarity with the linguistic form of metaphor. The relative ease of riddles may also reflect a greater motivation to solve them because they are perceived as a form of game.

In conclusion, the results of this study help reveal which surface aspects and task demands of metaphors are—and are not—obstacles to understanding. While recognizing that the asserted equivalence is not to be taken literally does not pose a problem, each of the three other factors—the unfamiliarity of the metaphoric form, the nonexplicitness of the analogical comparison, and the analytic task of explicating the ground—do, in fact, prove to be obstacles to comprehension of metaphors based on grounds of physical resemblance. Whether this same analysis applies to metaphors with abstract, conceptual grounds, or to ones for which a literal interpretation is plausible, remains to be determined.

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